

**REMARKS**

Claims 1-27 were previously cancelled. Applicants reserve the right to file continuation applications directed towards the cancelled subject matter. Claims 28-44 are currently pending in the present application.

**Maintained Rejections**

**Rejection Under 35 U.S.C. §102(b) and §103(a)**

Claims 28-41 are rejected under 35 U.S.C. §102(b) as being anticipated by or, in the alternative, under 35 U.S.C. §103(a) as obvious over JP 2001058818 (herein after "JP '818") for the reasons set for the in the previous Office Action. Office Action page 2. As stated in the previous amendment and response, claim 41 is an independent claim and does not fall within claims 28-40. The rejection is understood to be relevant to claims 28-40.

In response to Applicants' previous arguments, the Examiner states:

However, it is noted that the features upon which applicant relies (i.e., gamma-alumina formation) are not recited in the rejected claim(s).

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JP '818 expressly teaches heat treatment at 800 degrees C (Paragraph 12). Therefore JP '818 anticipates, "the step of heat treating the mixture is conducted below the melting point of the diluent", even if heating at 800 degrees C is not a preferred embodiment.

Office Action page 4. Applicants respectfully contend that the present invention does not in any way relate to the formation of *gamma*-alumina, but rather the formation of *alpha*-alumina. While Applicants believe that this argument is supported by the explicit teachings of the reference for the reasons of record and herein, in order to further substantiate that the cited reference does not teach or suggest the formation of alpha-alumina, Applicants also submit concurrently with this Response a Declaration Under 37 CFR §1.132 by Dr. Michihito Muroi.

Dr. Muroi explains that at no instance in JP'818 did the inventors teach or suggest the formation of alpha-alumina. Rather, Dr. Muroi avers that one skilled in the art would readily comprehend that JP '818 discloses a method whereby gamma-alumina is

formed when the temperature of heat treatment is below 900°C, with alpha-alumina plate-like particles can only be formed above 900°C. The flux used in JP '818 is sodium sulfate which has a melting point of 884°C (according to Wikipedia). Thus JP '818 teaches that the heat treating temperature must be above the melting point of the diluent to form alpha alumina.

Claim 28 of the present application specifically includes the following two features which are not disclosed in JP '818:

- a) that "...the step of heat treating the mixture is conducted below the melting point of the diluent"; and,
- b) that the mixture is heat treated to "form substantially discrete plate-like alpha- alumina particles..."

The basis of the present application is the ability to form plate-like alpha-alumina particles below the melting point of the diluent. The claims of the present invention do not in any way make reference to gamma-alumina. To anticipate, a prior art reference "must disclose each and every feature of the claimed invention, either explicitly or inherently." MPEP §2131; *Glaxo Inc. v. Novopharm Ltd.*, 52 F.3d 1043, 1047 (Fed. Cir. 1995). JP '818 neither teaches nor suggests the formation of alpha alumina. The reference does not anticipate claims 28-41 since it does not contain each and every element of the claimed subject matter. Likewise, JP '818 does not render the present claims obvious. There would be no motivation to alter the method of JP '818 because the alteration would not result in Applicants' claimed method. The process as disclosed in JP '818 would not produce the plate-like aluminum nano-particles because the temperature is too high, therefore, there would not be a reasonable expectation of success. Withdrawal of the rejection is respectfully requested.

#### Rejection Under 35 U.S.C. §103(a)

Claims 41-44 are rejected under 35 U.S.C. §103(a) as being obvious over JP '818 in view of Mohri *et al.* (U.S. Patent No. 6,521,203, hereinafter "Mohri") for the reasons set for the in the previous Office Action. Office Action page 2. The Examiner states that although JP '818 does not expressly teach the milling of the aluminum precursor, Mohri teaches the step of ball milling agglomerated coarse particles. The Examiner then concludes that it would have been obvious to alter the process of JP '818 to include the step of ball

milling because a person of ordinary skill in the art would be motivated to produce a product that did not contain agglomerated particles.

Contrary to the Examiner's assertions, Applicants respectfully assert that Mohri does not cure the deficiencies of JP '818. The references being combined must provide a reason, suggest, or motivate one skilled in the art of the desirability and thus the obviousness of making the combination (MPEP §2143). Moreover, the references must be viewed without the benefit of impermissible hindsight vision afforded by the claimed invention; and there must be a reasonable expectation of success (MPEP §2143.02).

In support of the argument that the explicit teachings of the references do not render the current claims obvious, Applicants again direct the Examiner's attention to the Declaration of Dr. Michihito Muroi. Dr. Muroi explains, in detail, how the process of Mohri is fundamentally different from the present invention. The presently claimed production of an alpha-alumina particle with a low aspect ratio combined with a heat treatment step performed at an ambient atmosphere results in a simplified and less expensive process. In addition, the milling step disclosed in Mohri acts to separate alumina crystals after formation of the alpha alumina phase, in contrast to formation of the aluminum precursor compound as described in the present invention. Dr. Muroi explains that the combination of JP '818 and Mohri results in a process wherein molten alumina salt particles are milled after formation. The presently claimed process does not involve melting of the alpha alumina particles. A person of skill in the art would have no motivation to combine the two references because the resulting method would more time consuming, more expensive, and more complex (i.e., containing additional steps). There is no expectation that the combination would be successful because the combination would not result in Applicants' presently claimed invention. Withdrawal of the rejection is respectfully requested.

### **New Grounds of Rejection**

#### **Rejection Under 35 U.S.C. §102(b) and §103(a)**

Claims 28-34 and 39-40 are rejected under 35 U.S.C. §102(b) as being anticipated by, or, in the alternative, under 35 U.S.C. §103(a) as obvious over Hisanori (JP A-60-54916). The Examiner states that Hisanori teaches a process of making hexagonal flake alumina with a ratio of particle size to thickness of 5-15 using the process of the present

invention. The Office Action does not indicate how or why a person skilled in the art and armed with the teachings of Hisanori would have been motivated to alter the teachings of the reference. Office Action pages 2-3.

Applicants respectfully traverse the rejection. As described fully in the Declaration of Dr. Muroi, Hisanori teaches that plate-like alpha alumina, formed from a mixture of amorphous alumina and a sulfate, can only be formed above the melting point of sulfate. The present invention comprises heat treatment below the melting point of the diluent. As described above, this process is both less expensive and less complicated than that described in Hisanori. Dr. Muroi describes in detail in paragraphs 11-14 of his declaration the replication of several of the Examples described in Hisanori. As attested to by Dr. Muroi, Hisanori clearly does not teach the production of plate-like alpha-alumina particles at a temperature below the melting point of the second phase compound, but instead teaches that the temperature must be raised above the melting point of the diluent. Hisanori does not teach every element of the presently claimed invention. Additionally, the claims are not obvious over Hisanori. A person of skill in the art would have no motivation to alter the reference because the resulting method does not result in the fabrication of plate-like alumina particles. Applicants respectfully request withdrawal of the rejection.

Rejections Under 35 U.S.C. §103(a)

Hisanori in view of Isao

Claims 35-38 are rejected under 35 U.S.C. §103(a) as being obvious over Hisanori in view of Isao (JP 06-329412). The Examiner states that while Hisanori does not teach the step of adding a fluoride mineralizer, this deficiency is cured by Isao. The Examiner then concludes that it would have been obvious to perform the process of Hisanori including the step of baking aluminum hydroxide in the presence of a fluoride compound. The Examiner contends that the motivation to do so can be found in the desire to obtain an alpha-alumina "having structure close to a regular system and excellent chipping resistance." Office Action page 3.

Applicants respectfully traverse the rejection. As explained above, the process of Hisanori is fundamentally different from the present invention. As Dr. Muroi describes in detail in the attached Declaration, Hisanori does not teach the production of plate-like alpha alumina particles at a temperature below the melting point of the second phase

compound, but, instead, teaches that the temperature must be raised above the melting point of the diluent.

The teachings of Isao do not cure these deficiencies. The process of Isao produces alumina particles with a low aspect ratio (1-3), in contrast to the method of the present invention. The Isao reference also does not utilize a diluent. See Declaration of Dr. Muroi, paragraph 17. One of ordinary skill in the art would have no motivation to combine the methods of Hisanori and Isao because the combination would yield a process that is both different than the present invention and is more complex and more expensive. Applicants respectfully request withdrawal of the rejection.

Hisanori in view of Mohri

Claims 41-44 are rejected under 35 U.S.C. §103(a) as being obvious over Hisanori in view of Mohri. The Examiner contends that while Hisanori does not expressly teach that the aluminum precursor is milled, Mohri teaches the ball milling of agglomerated coarse particles. The Examiner then concludes that it would have been obvious to alter the process of Hisanori to include the step of ball milling. The suggestion or motivation to do so "would have been to produce a product that did not contain agglomerated particles." Office Action pages 3-4.

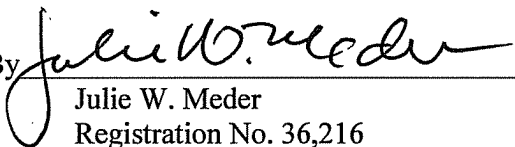
Applicants respectfully traverse the rejection. Hisanori clearly does not teach the production of plate-like alpha-alumina particles at a temperature below the melting point of the second phase compound, but instead teaches that the temperature must be raised above the melting point of the diluent. Mohri does not cure these deficiencies because the milling step disclosed in Mohri acts to separate alumina crystals after formation of the alpha-alumina phase. This is in contrast to formation of the aluminum precursor compound as described in the present invention. The combination of the two references would result in a process wherein molten alumina salt particles are milled after formation. The present application does not teach melting of the alpha-alumina particles. There is no motivation to combine Hisanori and Mohri as the process would be more time consuming, more expensive, and more complex (i.e., containing additional steps). One of skill in the art would have no expectation that the combination would be successful because the combination would not result in Applicants' presently claimed invention. Withdrawal of the rejections is respectfully requested.

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**CONCLUSION**

In view of the foregoing remarks, it is respectfully submitted that all pending claims are allowable. Accordingly, reconsideration and withdrawal of the rejections and a Notice of Allowance are respectfully requested.

Respectfully submitted,  
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